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The prevailing colors are white, pink, —sometimes playing into orange, —and a pale green. Blue was only seen in a small incrusting sponge. What proportion of light reaches a certain depth we shall try to determine during our next explorations. It is certain, however, that the deep sea animals have generally well-developed eyes, larger if anything than those of their congeners of shallow water."

THE GEOLOGICAL SURVEY OF ILLINOIS.*—Prof. Worthen announces that the Carboniferous system attains a maximum of 2500 feet in this State, and contains ten seams of coal, six of them in the lower, three hundred feet of the true coal measures being of workable thickness. The whole series is exposed in the banks of the Illinois, which cuts diagonally across these beds for more than a hundred miles from north-east to south-west.

Prof. Worthen points out from theoretical data what may possibly prove to be a very serious mistake in Prof. Owen's estimate of the thickness of the coal measures in Kentucky. If it prove a true criticism, Kentucky is not so rich by one half in workable coal seams as she has been represented. Prof. Worthen thinks that Prof. Owen mistook two outcroppings of the same sandstone for two different layers, and that these two, which are distinguished as the "Anvil-rock Sandstones," and the "Mahoning Sandstone," in the Kentucky section, are identical. If this be so, the series of coal seams between the latter and the former, do not overlies the Mahoning Sandstone, but are merely similar or duplicate beds, occurring in the same geological horizon. "The product of our coal mines for the past year (1867) according to the most reliable statistics, is fully 1500000 tons." "There is, perhaps, no other area of equal extent in the United States where coal is so easily obtained with a moderate expenditure of capital as in the Illinois Coal-field." The strata are undisturbed; their inclination from the western border to Springfield is not over seven feet to the mile, and the principal seams are accessible in the central parts of the State, at from two hundred to four hundred feet. Our space only permits us to name the counties, the geology of which is fully described. They are Alexander, Union, Jackson, Perry, Jersey, Greene, Scott, Washington, Clinton, Marion, Jefferson, Cook, and La Salle Counties.

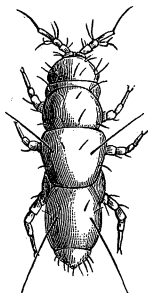
The second part, by Messrs. Meek and Worthen, is devoted to Palæontology, and contains among much interesting matter, full descriptions and figures of the remarkable Carboniferous crustaceans from Mazon Creek, which were first made known by this survey. Mr. Scudder describes the fossil insects, and gives many interesting details. From these it appears that we have from the Grundy County Carboniferous rocks, besides those described in Vol. I, one species of Eurypteris and two Crustaceans allied to the common *Limulus*; two Isopods, and two Macrurous Decapods. Among insects there are two Myriapods, one of enormous size, two species of Neuroptera belonging to two genera, and two species

*Geological Survey of Illinois. A. H. Worthen, Director. Vol. III, Geology and Palæontology. 4to, pp. 574. With twenty plates and numerous illustrations.

allied to the Scorpions, and one whose affinity is doubtful. The species formerly described and figured as a caterpillar in Vol. II, page 163 of the *NATURALIST*, is now thought, from the study of additional specimens, to be a worm, the hairs on the body being longitudinally striated, and, according to Dr. Packard, resembling those of *Aphrodite*.

THE ANCESTRY OF INSECTS; FOSSIL INSECTS AND CRABS, IN ILLINOIS.* —Prof. Haeckel, of Jena, has been speculating as to the ancestors of the articulates. He considers the ancestral form of the crustacea as a zoëa-like creature, resembling the larval or zoëa-stage of the crab. As to the ancestor of the air-breathing, terrestrial articulates (insects, spiders and centipedes), he proposes the theory that it was a zoëa which, probably, about the Devonian Period, adopted a terrestrial life. As this is an age of speculation, we should suggest, that the ancestors of the insects (including the six-footed insects, spiders and myriapods) must have been worm-like and aquatic, and when the type became terrestrial we (still speculating) would imagine a form somewhat like the young *Pauropus* (Fig. 1) discovered by Sir John Lubbock in England, which combines in a remarkable degree the characters of the myriapods and the degraded wingless insects, such as *Smynthurus*, *Podura*, etc. Some such forms may have been introduced late in the Silurian period, for the interesting discoveries of fossil insects in the Devonian of New Brunswick, by Messrs. Hartt and Scudder, and those discovered in the lower part of the Coal Measures, at Morris, Illinois, and described by Messrs. Meek, Worthen and Scudder, reveal carboniferous myriapods, *Euphorberia* (two species), more highly organized than *Pauropus*, and a carboniferous scorpion (*Buthus?*), closely resembling a species now living in California; together with another scorpion-like animal, *Mazonia Woodiana*; while the Devonian insects described from St. John, by Mr. Scudder, are nearly as highly organized as our grasshoppers and May-flies. Dr. Dawson has also discovered a well developed milleped (*Xylobius*) in the Lower Coal Measures of Nova Scotia; so that we must go back to the Silurian period in our search for the earliest ancestor; or (if not of Darwinian proclivities) prototype, of insects. As to the earliest Crustacean being a zoëa-form, have we not among the earliest known Crustaceans, the Trilobite (*Paradoxides*) and several allied forms of Lowest Silurian age, whose larval form was, undoubtedly, more or less worm-like, as are certain degraded marine Pill-bugs (*Bopyrus*) of the present day? Messrs. Meek and Worthen describe fossil Shrimps (*Anthropalæmon*) and Sand-fleas, in the Lower Coal Measures of Illinois, associated with a large Eurypterus, being a gigantic shrimp-like animal; a Trilobite (*Euproops Danæ*) resembling our

Fig. 1.



*The Palæontology of Illinois. Articulate Fossils of the Coal Measures. (Advance sheets of the Report of the Illinois State Survey.) By Messrs. Meek, Worthen and Scudder. September, 1868. 8vo.